Classification of Plant Kingdom



- Every single organism on Earth depends on plants for survival. There are 390,000 species of plants already know to us, and probably much more yet to be discovered! These include plants that are found on land and the sea. All of these plants are classified under the Plant Kingdom
- Very early on, biologists used the superficial features of plants and classified them based on these features. Some of the morphological features included colour, number, the shape of leaves as well as the habitat, etc.
- This system was considered as an artificial system of classification, as plants were classified based on vegetative characters. These vegetative characters can always show changes because of the effect of the environment. Therefore, many closely related species were classified under different divisions.
- As biologists became more aware of the other characteristics of plants, they slowly began another system of classification, called the natural system of classification. This system considered the external and internal features of plants while classifying them.

Plant life cycle Alternation of Generations



- In plants, there are two systems of reproduction. Each is called one generation.
 There is a rotation between these generations. So, one complete life cycle of a plant includes two generations that alternate with each other. Hence the whole mechanism is called alternation of generations.
- The two generations or life cycles that occur are called the sporophyte generation and the gametophyte generation. When you speak in genetic terms, it is the rotation in between the haploid and diploid stages. This refers to the chromosomes within the plant cells.
- A diploid cell has two sets of chromosomes (one each from the male parent and female parent). A haploid cell has only one set of chromosomes. The haploid generation gives birth to plants with diploid cells. This then creates a generation of haploid plants, which again give rise to a generation of diploid plants. And thus the life cycle of a plant will go on.
- The whole life cycle of plants is very complex. But the greatest benefit it gives is the greater genetic control. And how does this happen? In the haploid stage, bad genes can be removed and the diploid stage allows for greater genetic diversity.

- **Gametophyte** A Haploid plant
- **Sporophyte** A Diploid plant
- Mitosis The process by which gametophytes produce haploid gametes.
- **Fertilization** Fusion of male and female gametes to form a diploid zygote.
- **Meiosis** The process by which sporophyte produces spores that are haploid.

Life Cycle of a Plant

The life cycle of plants shows some great variation. This is due to the fact that all plants are not similar. Right from simple algae and bryophytes to the complex vascular angiosperms, there is a great amount of diversity in the structure and features. Therefore, different generations are dominant in different plants. The following figure gives you an idea of the dominant and reduced stages in the life cycle of different plants.



- The *haplontic life cycle* is generally exhibited by algae. The sporophyte generation is represented only by a one-celled zygote. There are no free-living sporophytes. The gametophyte is the dominant phase.
- The *diplontic life cycle* is commonly seen in gymnosperms and angiosperms with some variations. However, an Alga called Fucus also shows this kind of life cycle. In a diplontic life cycle, the diploid sporophyte is dominant,

photosynthetic and is the independent phase of the plant. The gametophyte stage is characterized by a single to a few-celled haploid gametophyte.

- Bryophytes and Pteridophytes show an intermediate condition called the *haplo-diplontic life cycle*, where phases are multicellular. But the dominant phase differs. In Bryophytes, the dominant phase is the gametophyte and in Pteridophytes, it is the sporophyte.
- According to this, the Kingdom Plantae has been divided into five major groups. They are:
 - > Thallophyta
 - > Bryophyta
 - > Pteridophyta
 - > Gymnosperms
 - > Angiosperms
- Each group of plants has special and unique features that belong exclusively to that group. While the thallophytes are the simplest of the plants, the angiosperms are plants with a complex structure and a very well developed vascular system and reproductive system. The gymnosperms are the group of plants that have an evolutionary significance. These are the first plants to have developed seeds, which is an efficient mechanism of continuing the plant generation at places away from the parent plant.





Bryophyta



Pteridophyta

